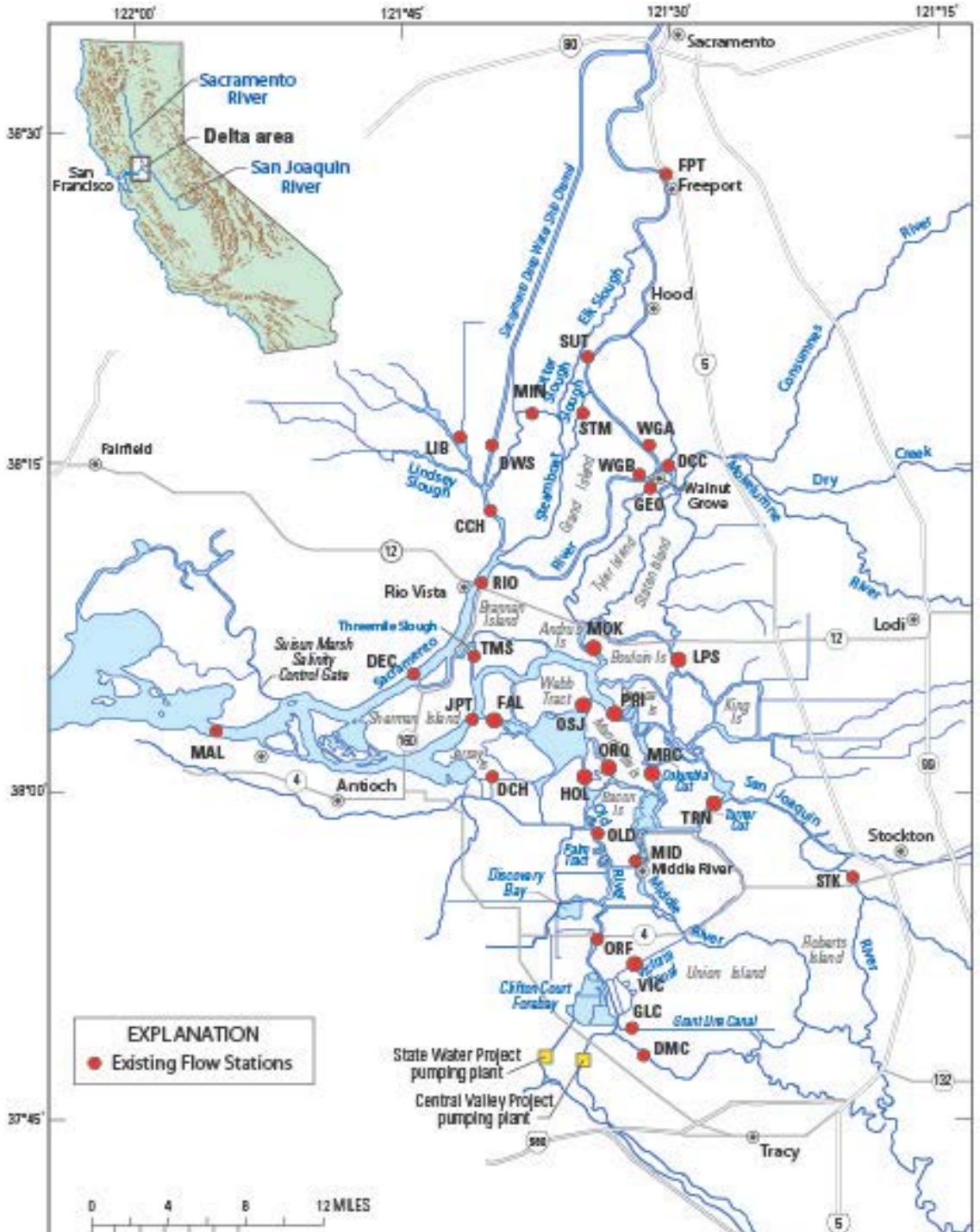
Implications of restoration on hydrodynamic and transport processes in the delta

A Valentine's Day Hangover

2/15/2013

Jon Burau, USGS

Flow Station Network (circa Nov 2011)



Base-line pre-project data

Conclusion

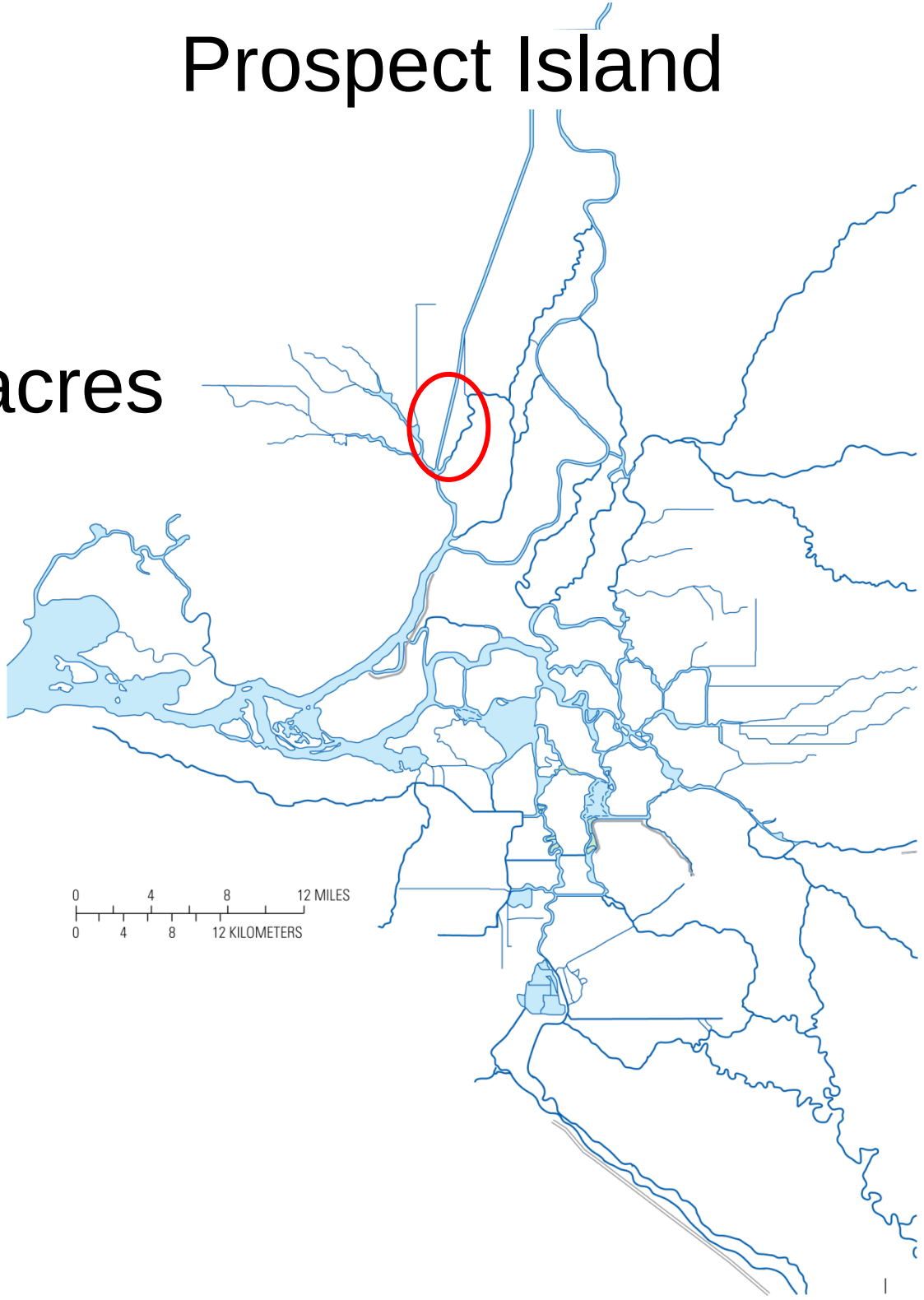
A restoration/conveyance masterplan is needed supported by a significant modeling capability (Hydro model + operations model).

Today's Plan

Discuss REGIONAL SCALE implications
of two restoration efforts:
(1) Prospect Island
(2) "Sutter/Miner Bypass"
(Levee setback figment of my imagination)

Prospect Island

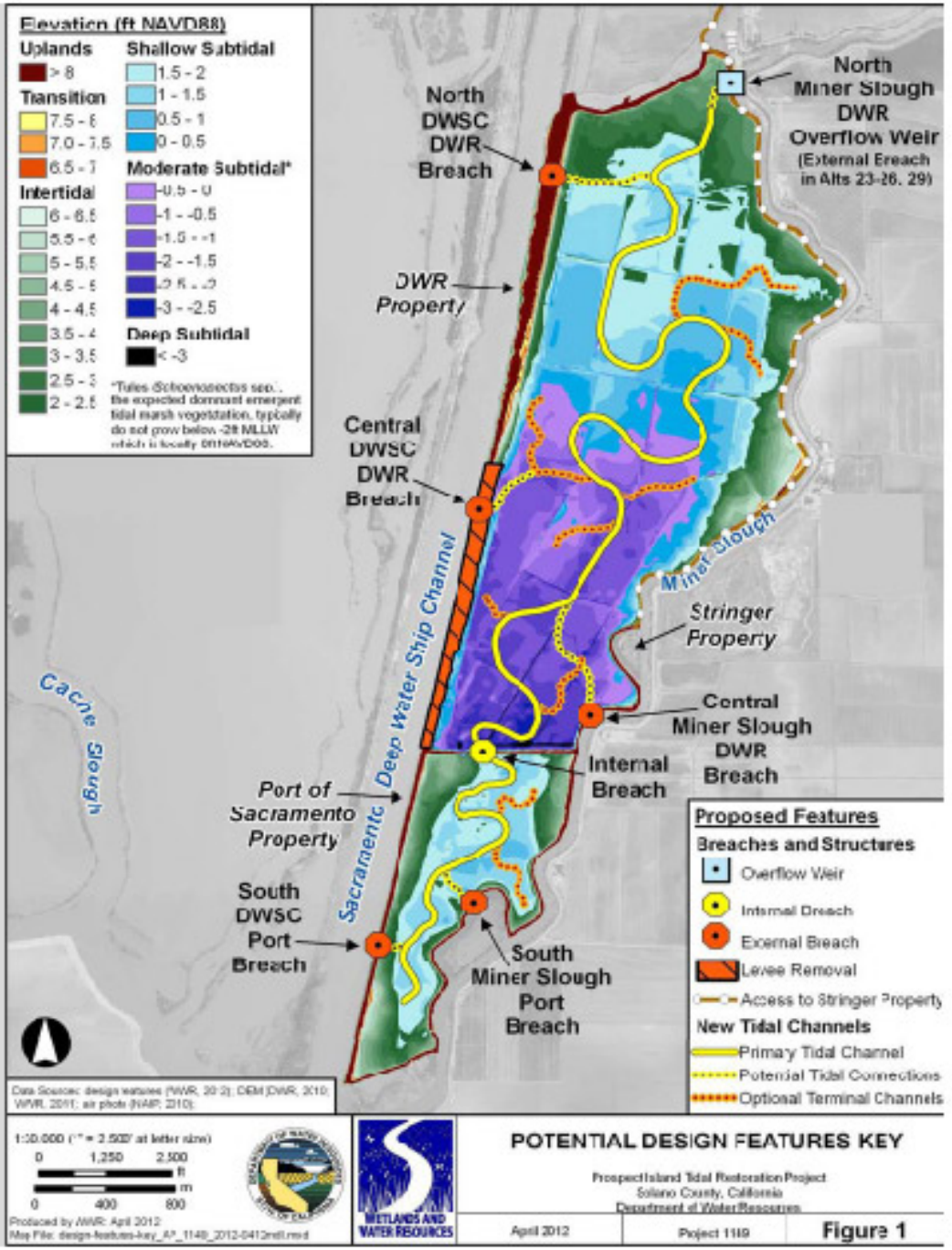
~1,300 acres



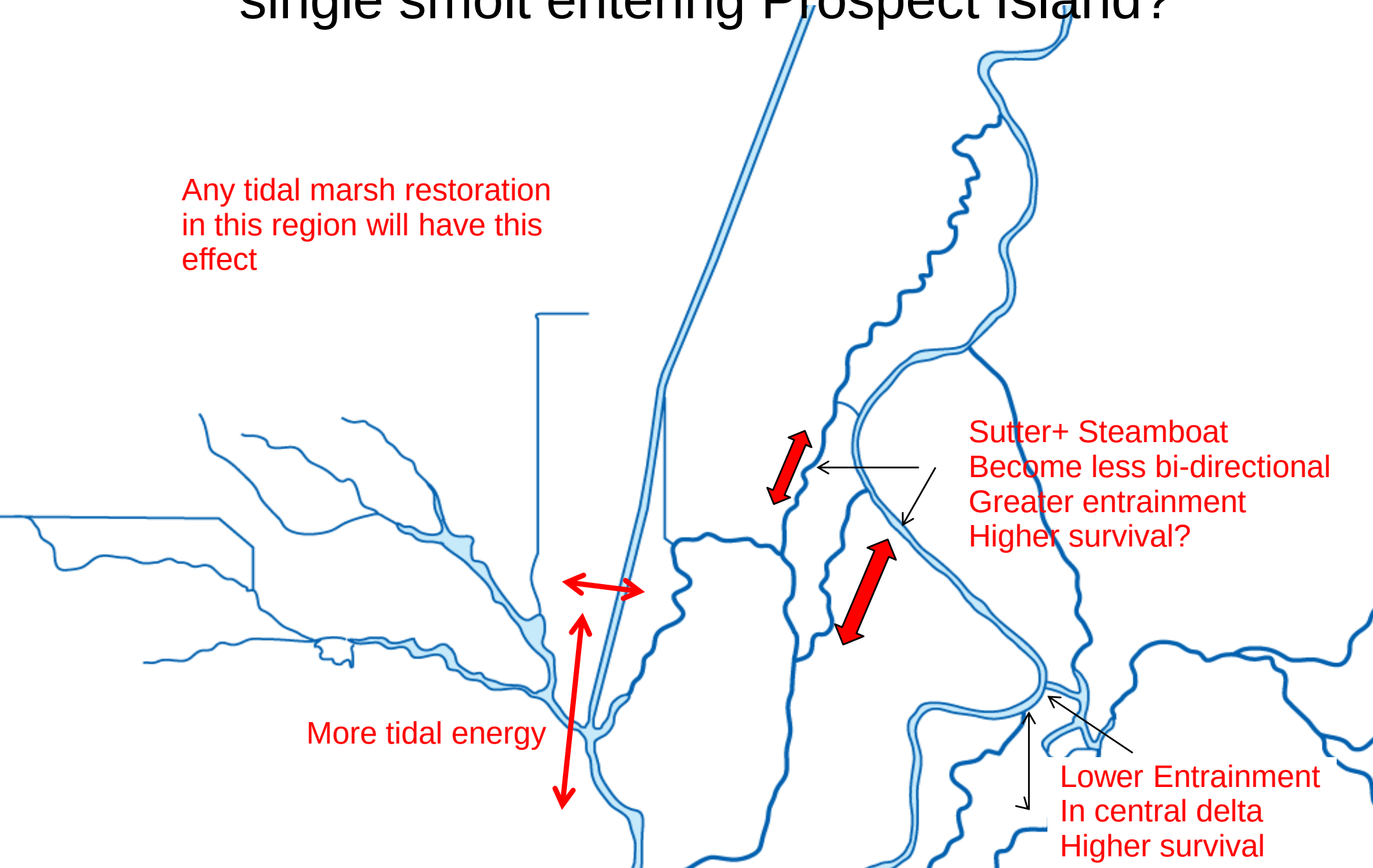
Prospect Island

Design Features Key

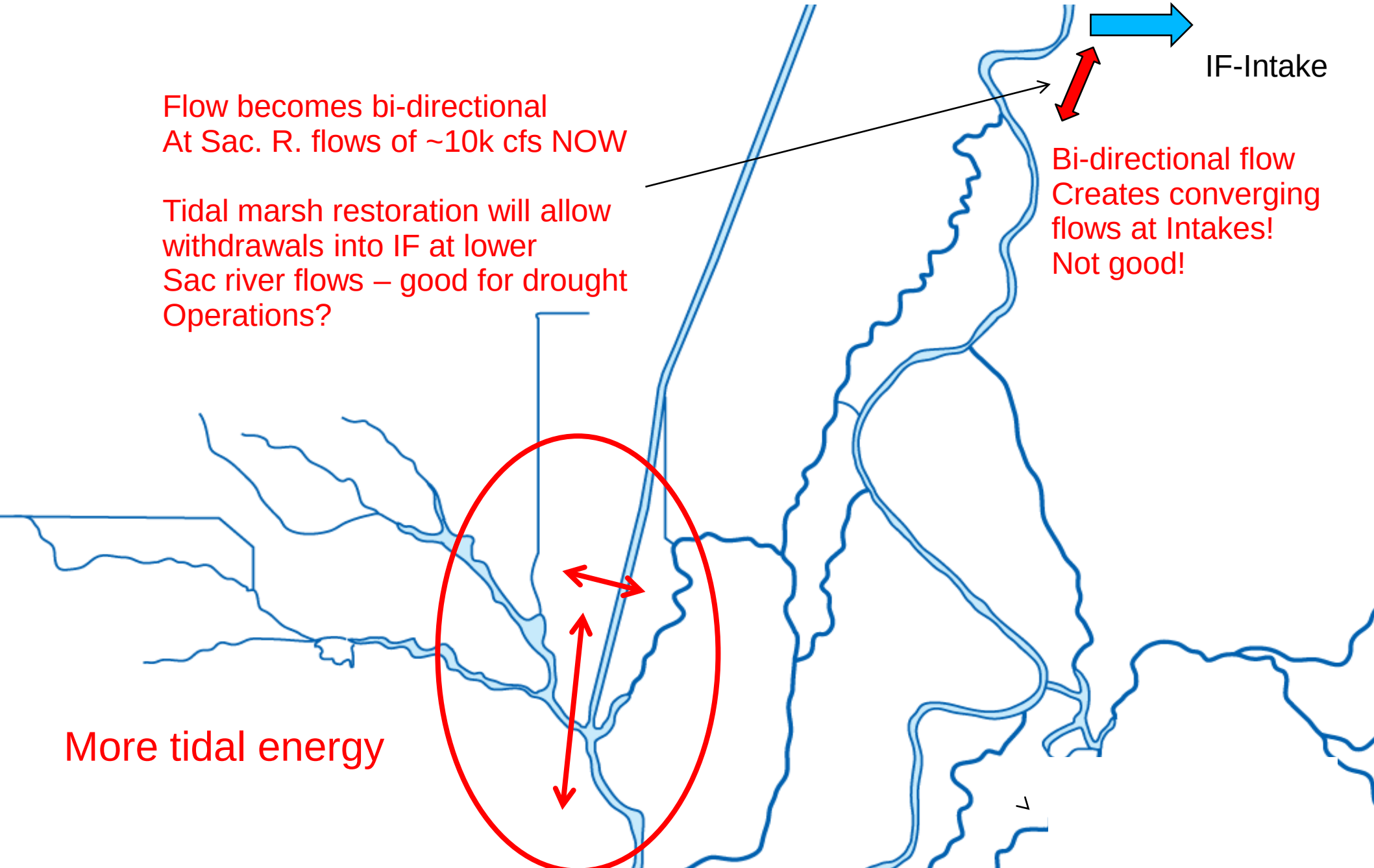
- Breaches
- Overflow weir
- Primary channels
- Secondary branch channels
- Connecting channels depending on selected breaches
- DWR and Port properties
- Adjacent property access



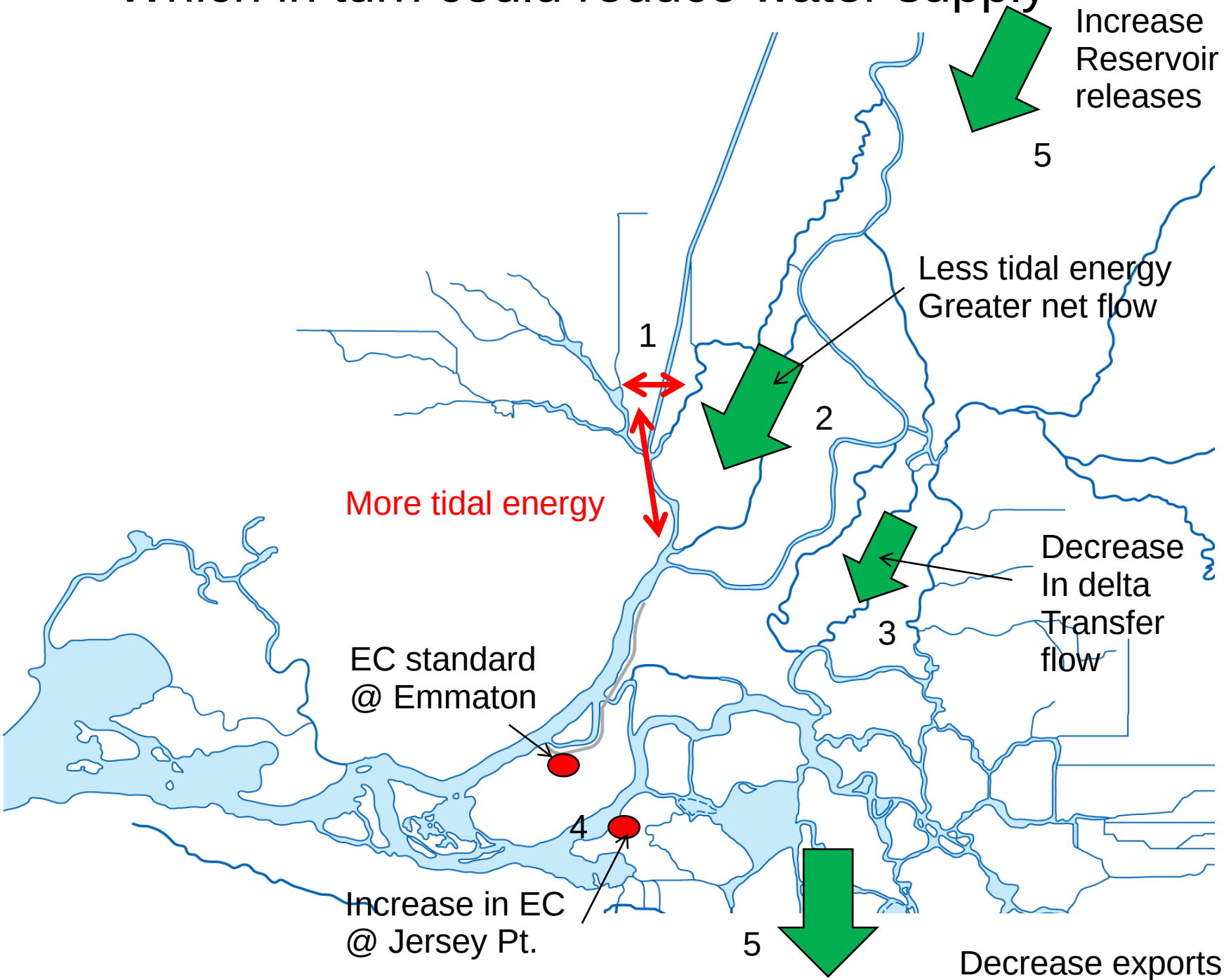
Effect on Salmon outmigration? Increased population level survival without a single smolt entering Prospect Island?



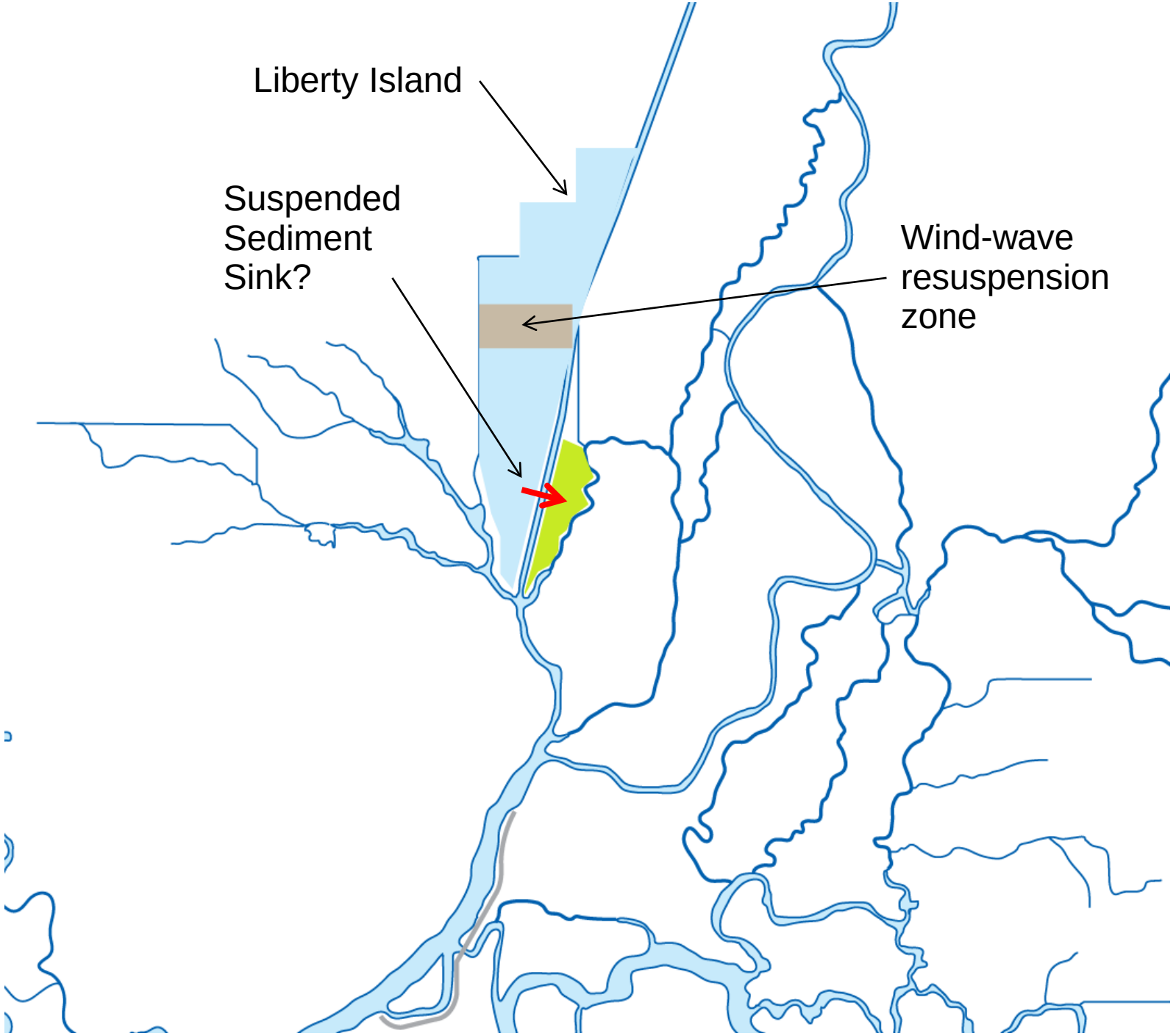
Greater water deliveries using Proposed Isolated Facility?



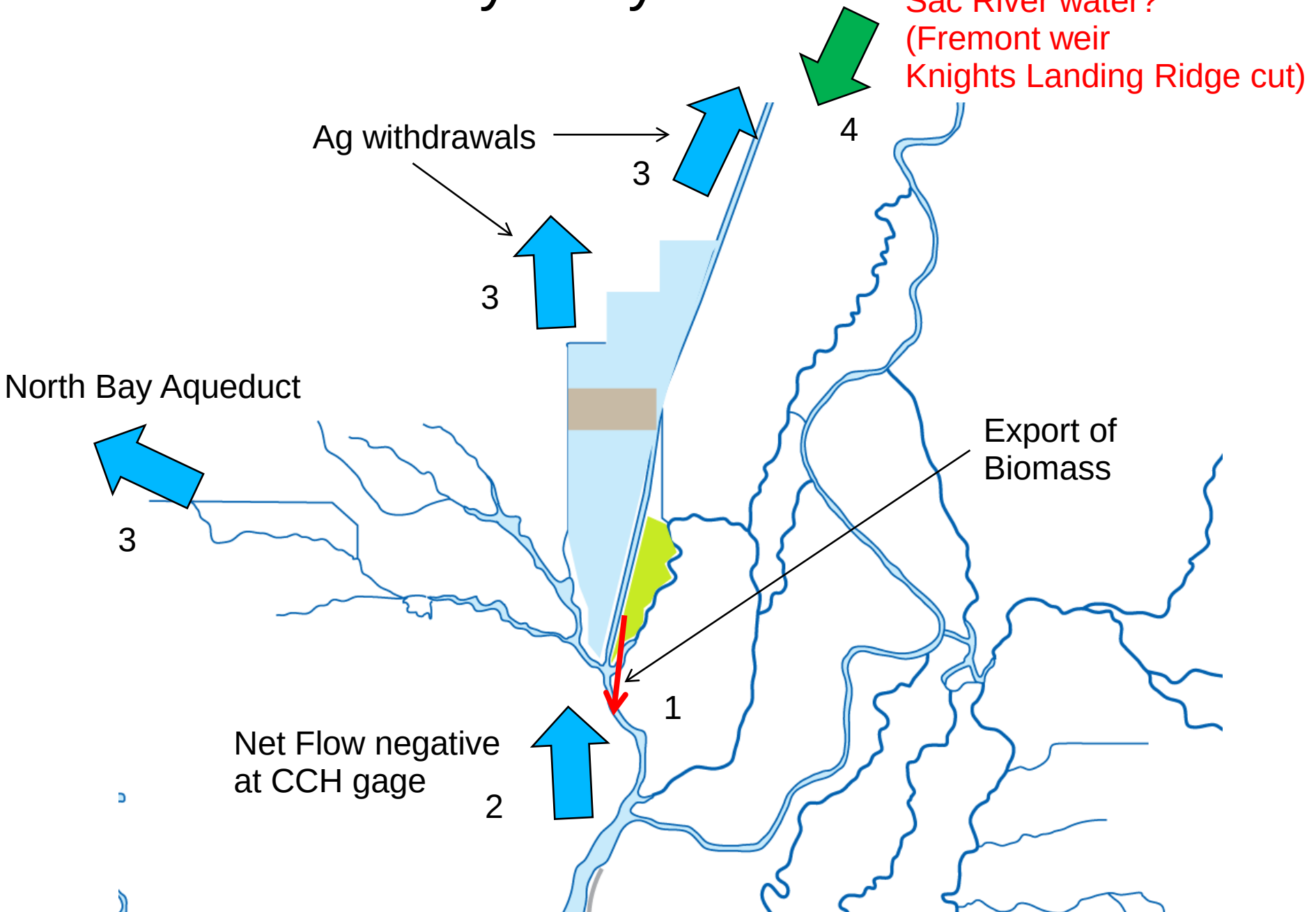
Effect on regional scale water quality?
Which in turn could reduce water supply



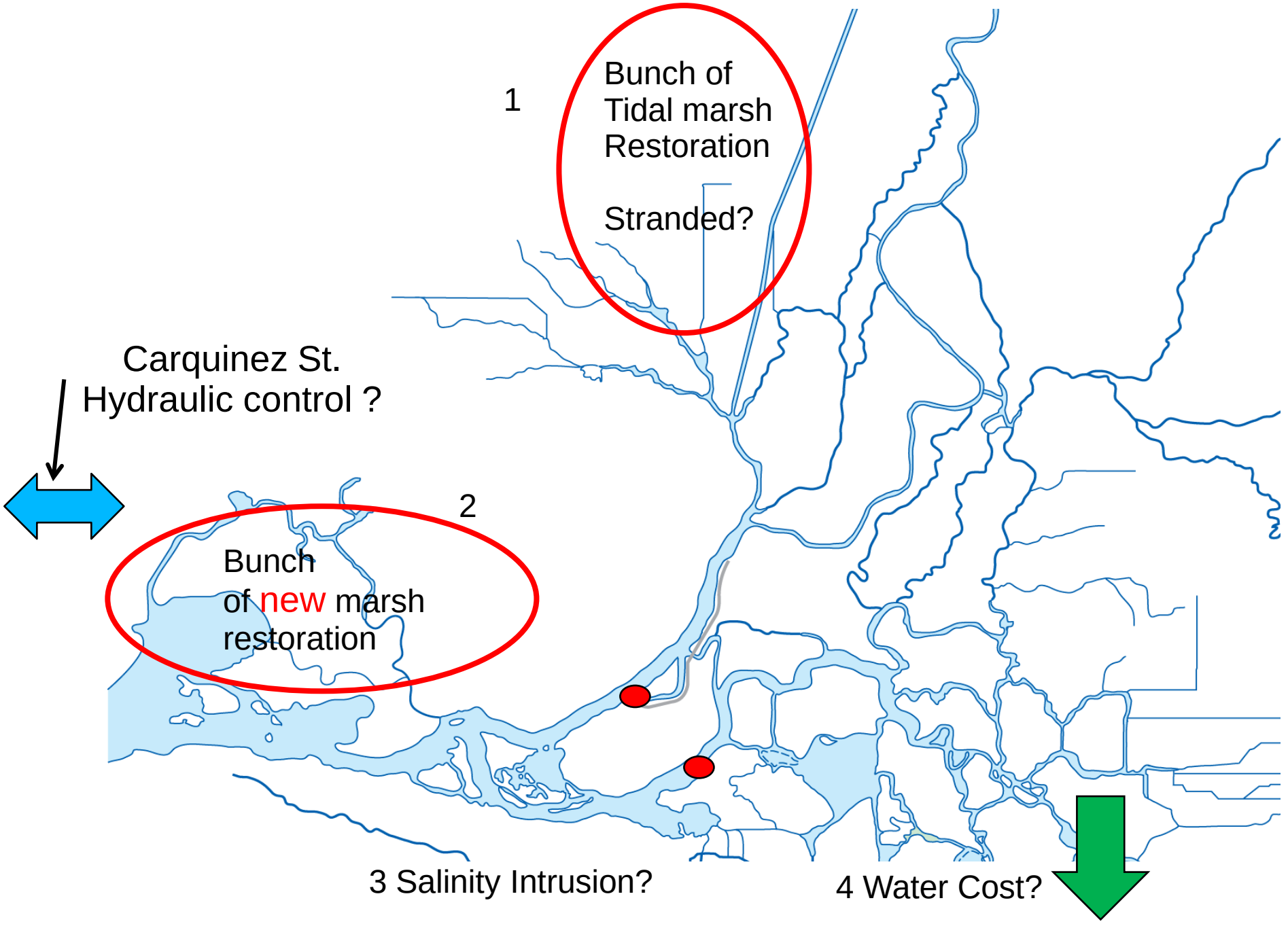
Effect on local turbidity field?



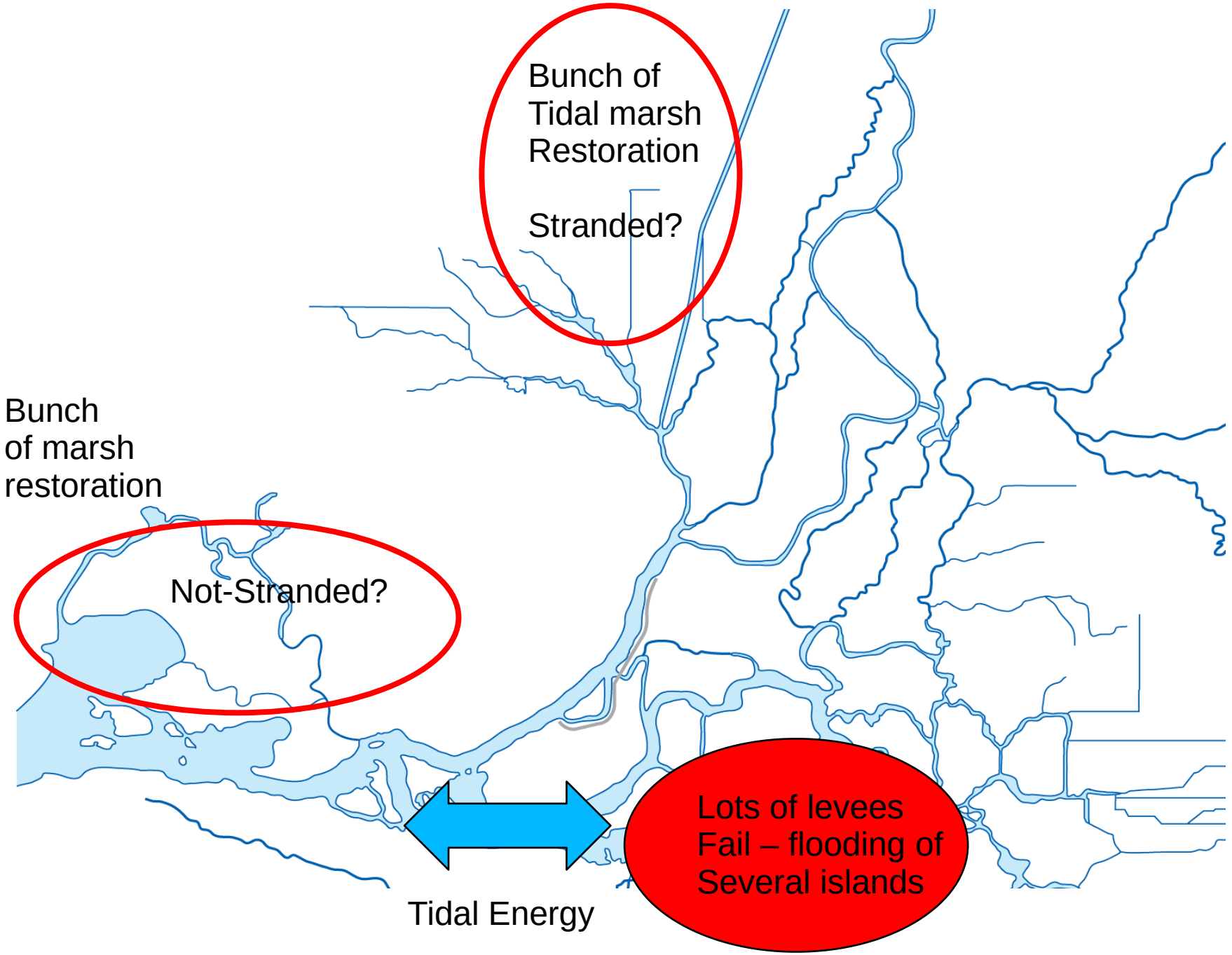
Effectiveness of restoration as donor habitat will be influenced by regional scale hydrodynamics



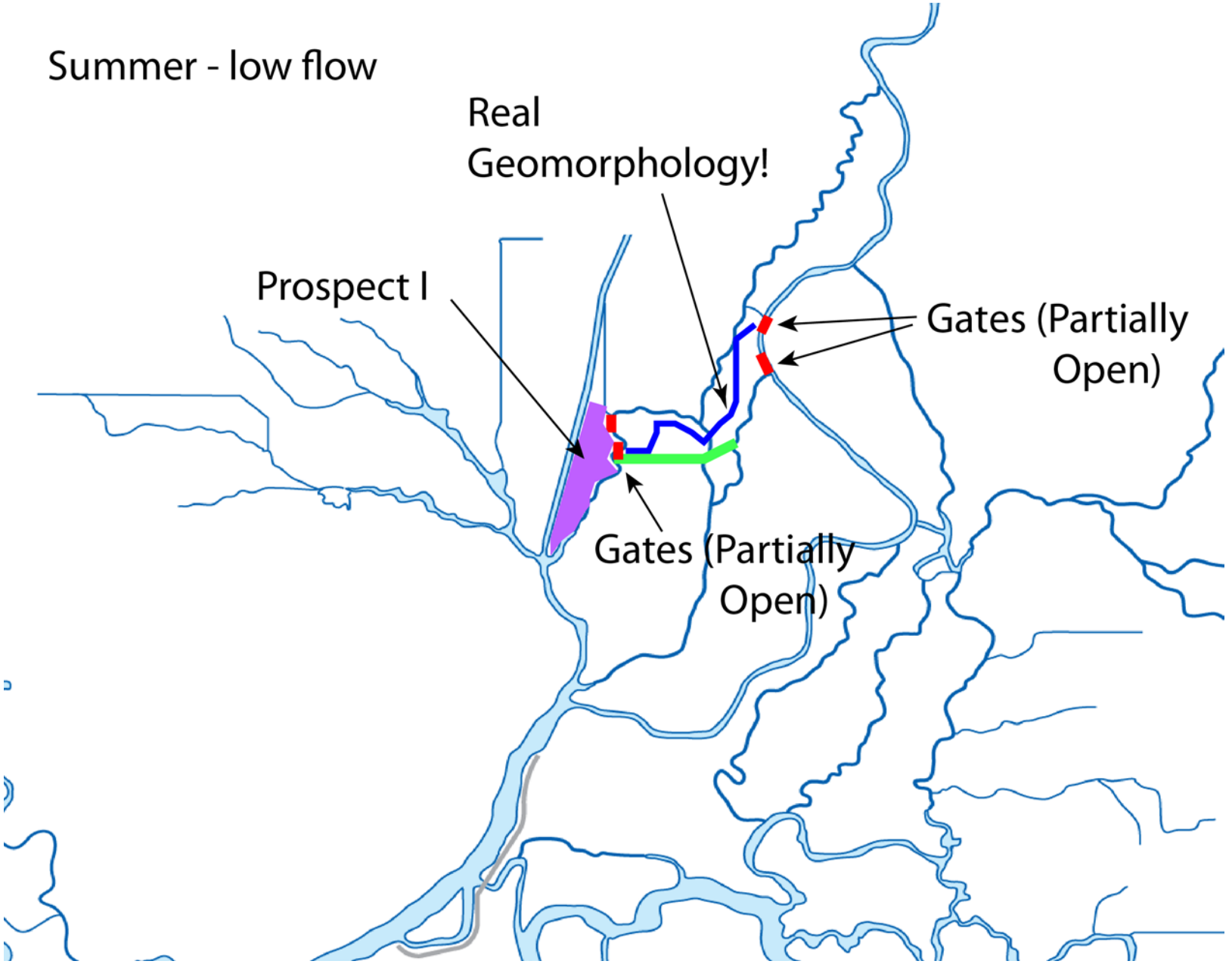
Finite Tidal Energy – take 1
Restoration Project Interaction



Finite Tidal Energy – take 2
Levee Failure – Island Flooding



Crazy Idea…. Miner Bypass



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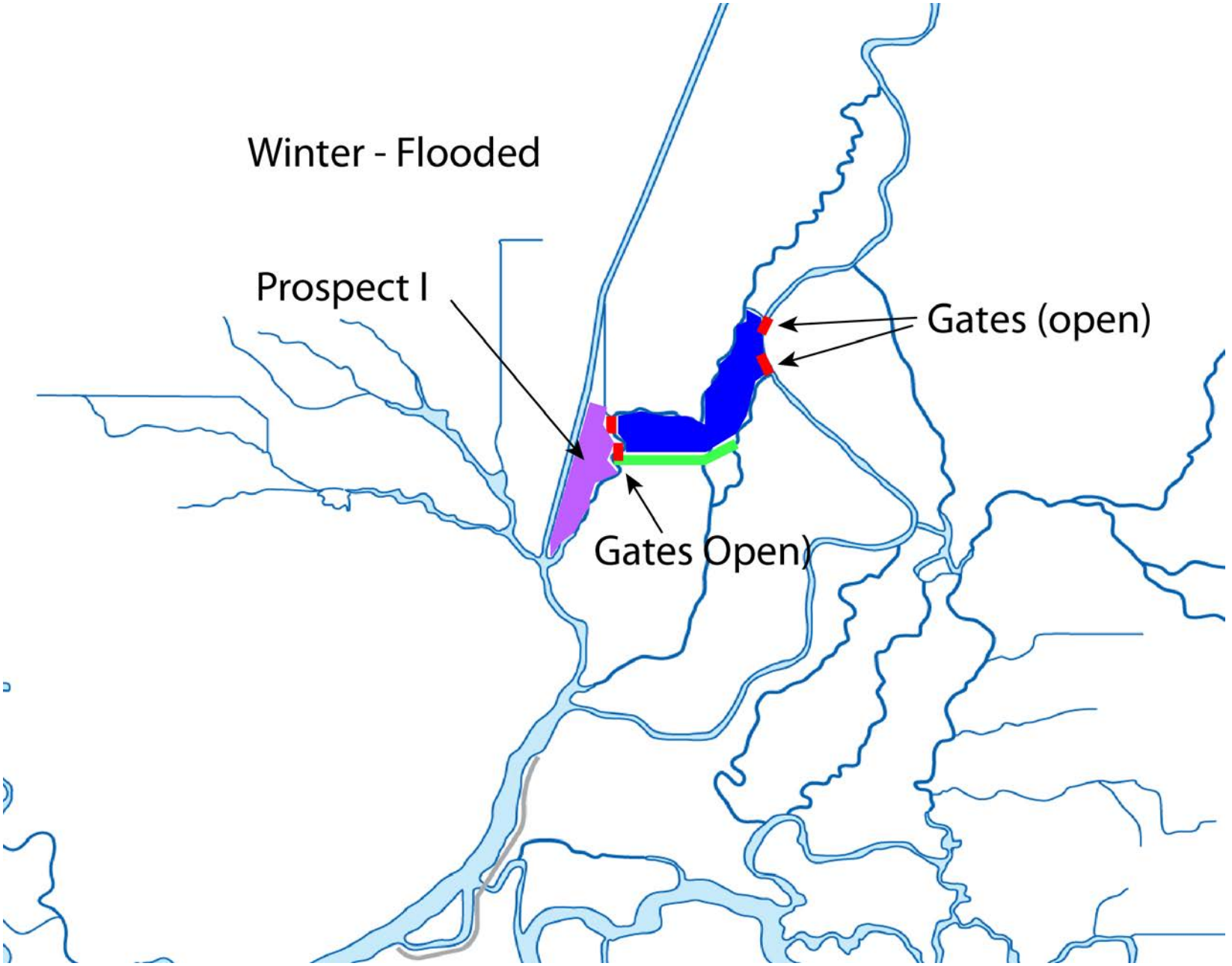


Whoa?! – Prospect Island
is in the way!

There are opportunity costs associated with everything we do!

We have limited tidal energy, money and a host of landscape constraints

How does Prospect fit in our longer term plans?

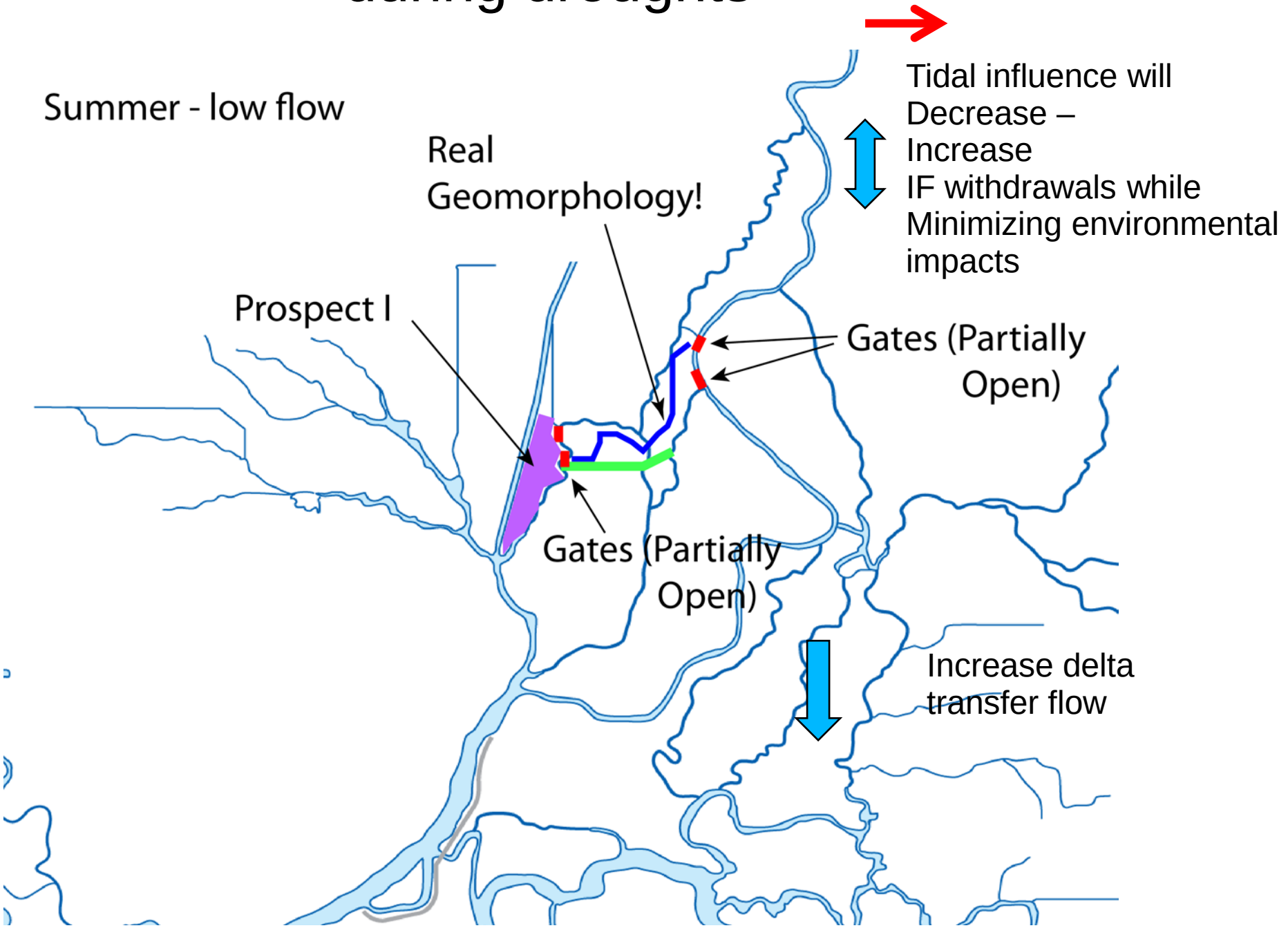
Increase water supply during droughts

Simply Close Gates

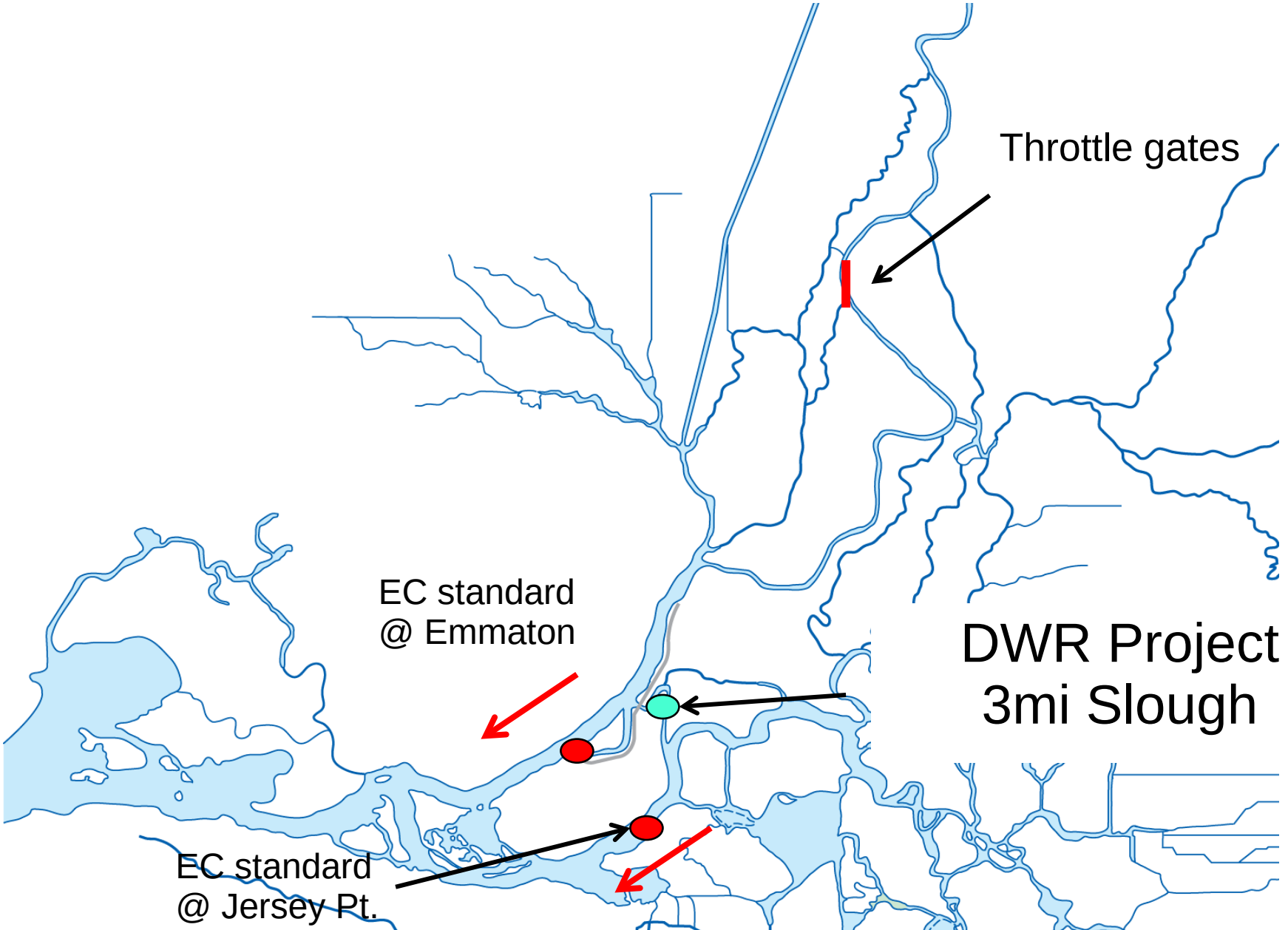
(1) Increase Delta Transfer Flow

(2) Reduce upstream tidal influence – increase IF withdrawals

Increase water supply during droughts

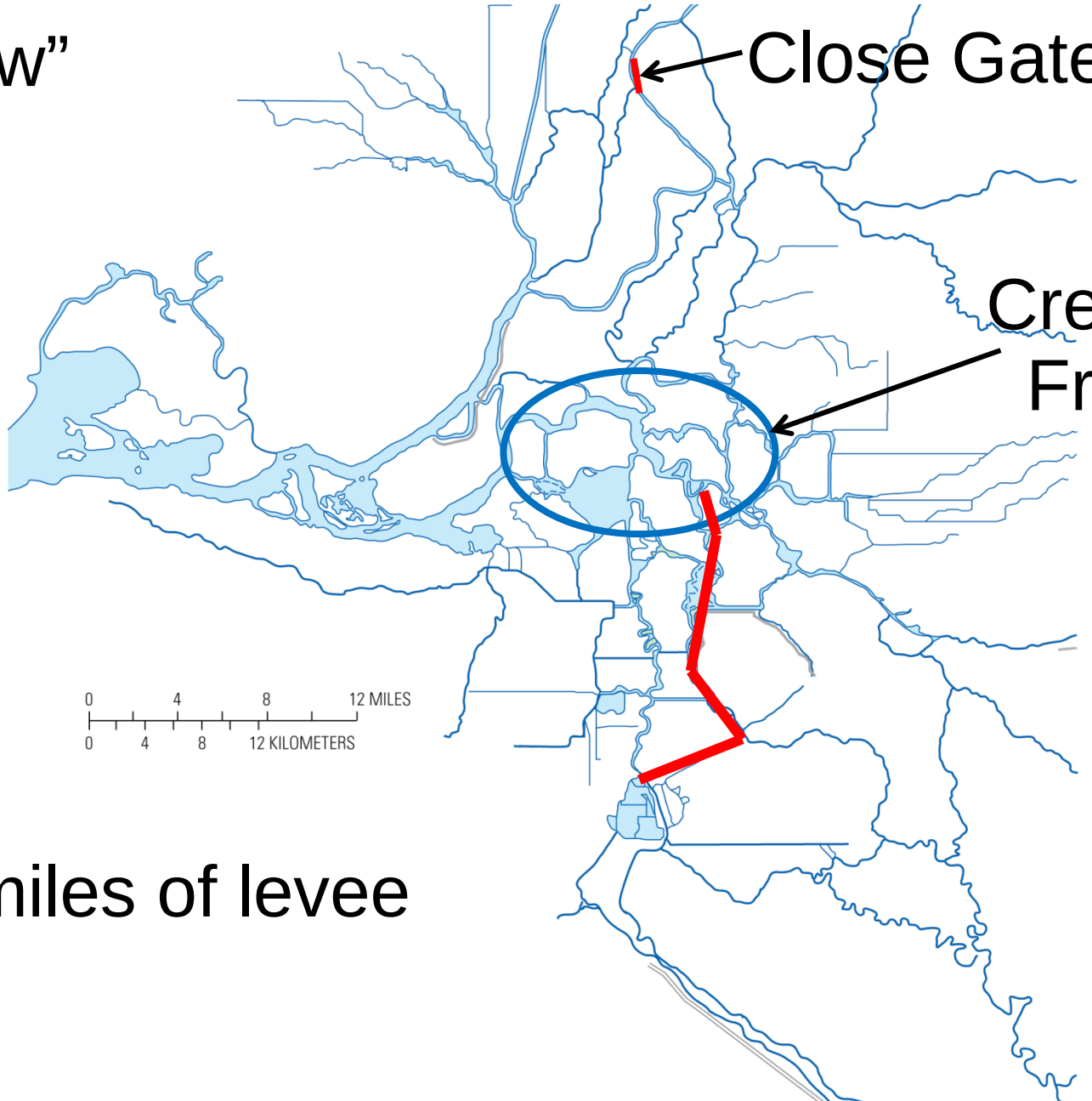


Balance Salinity between Sac and SJ – increase water supply



Rapidly restore exports after large number of levee failures

"Straw"



~30 miles of levee

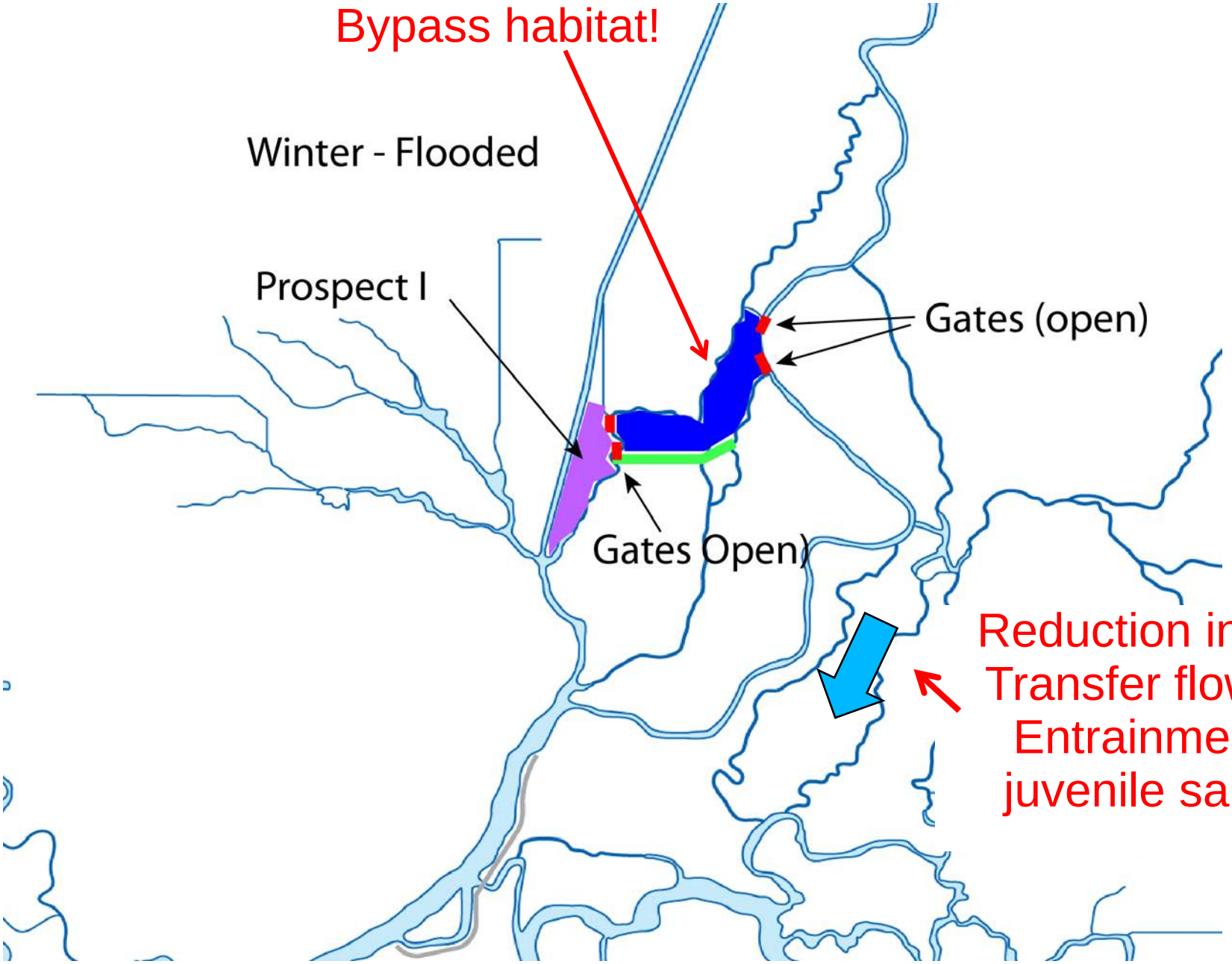
Increase salmon survival

Open gates wide (winter operation)

(1) Create bypass with actual habitat (cover, forage)

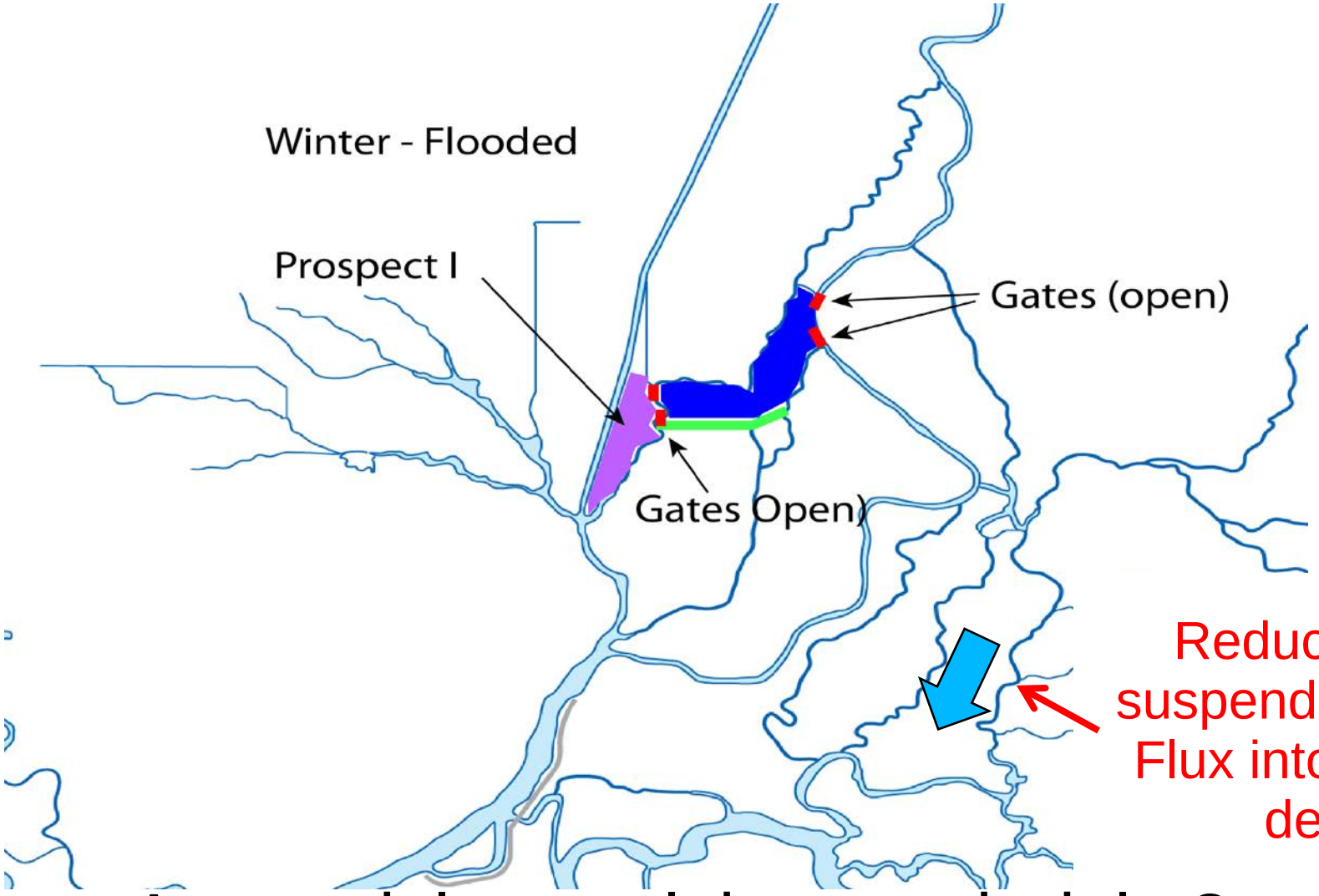
(2) Massively reduce delta transfer flow and entrainment of juvenile salmon into central delta

Good for salmon!



North delta salmon survival ~ 20-25% (100km)

Massive Reduction of Suspended Solids flux into central delta



Attract delta smelt into north delta?
Keep delta smelt out of central and south delta?

Conclusions

At the restoration scale proposed:

(1) There will be REGIONAL SCALE implications to proposed restoration efforts

(2) There will be interactions among restoration efforts

Final Conclusion

A restoration/conveyance masterplan is needed supported by a significant modeling capability (Hydro model + operations model).


Tour?